Cost and Labor Effective Produce Sanitation Methods For Small Farms

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INTRODUCTION

Proper postharvest practices and handling of fresh fruits and vegetables is essential to prevent foodborne illness. However, small growers may have difficulties setting up successful sanitation processes due to the expense of the equipment and uncertainty about the best process.

Growers need to understand that regardless of the production method, produce often contains bacteria that can cause foodborne illness that cannot be ignored. Therefore, we must find ways to wash and sanitize produce that are environmentally safe, and efficient in energy and labor usage. Two different spraying systems are introduced and the effectiveness of the two systems was evaluated by looking at the microbial populations on unwashed produce as compared to the two washing methods. Total plate counts and coliforms were analyzed for comparison.

This is project showed that proper selection and use of sanitizers is critical, regardless of production method, to reduce foodborne illness risk.

OBJECTIVES

- To develop a small scale produce washer/sanitizer for the more delicate crops like ripe tomatoes and English cucumbers
- The washer had to minimize handling, maximize sanitation, and be affordable.

MATERIALS & PREPARATION

Harvest : Greenhouse cucumbers and tomatoes were harvested and field tomatoes were obtained from a local produce auction. The samples were then treated as described in the Treatment Methods 1 and 2.

Choosing the correct sanitizer, and pH of your wash water is critical. pH, Chlorine and Peroxyacetic Acid concentration can be measured by testing strips.

Hot and cold water line in the cooler room of greenhouse facility

Thermometer used for consistent water temperature

WASHING & SANITATION METHODS

Method 1: Less Than $500

About 90 cucumbers per batch. Samples are washed evenly

The Peroxyacetic Acid (PAA) solution was manually applied from various direction with a spray nozzle by a person. **The implementation costs of this method are low, but it requires increased labor and water usage.**

Using a sprayer head and sufficient water pressure is important for removing the soil as well as not bruising or harming the product's delicate skin.

Potable water is a requirement

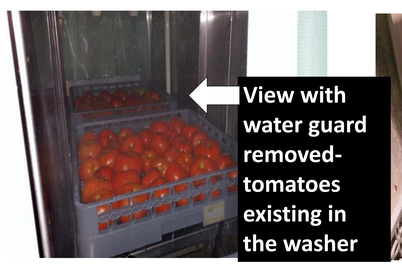
Method 2: Automated Unit for Less Than $1,000

A used commercial dishwasher was changed from 3 phase to single phase and from recirculating to open drain. The system's nozzles were also replumbed. Produce goes through the machine on a conveyor belt and the PAA solution was applied from the top and bottom. **With this method, the initial start up cost ishigher, but labor and water usage is reduced.**

Modified Commercial dishwashing unit

Deflowered Cucumbers in the crate at entrance

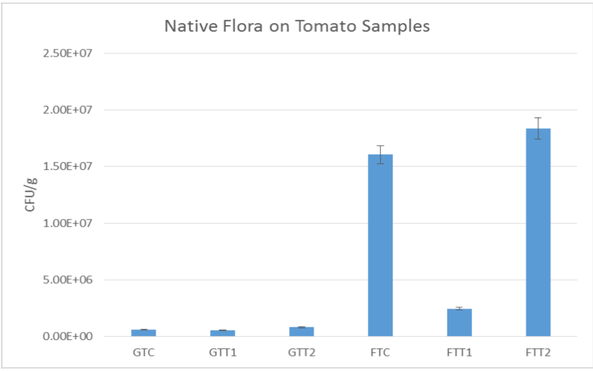
Sample Entrance



View with water guard removed- tomatoes existing in the washer

Cucumbers are washed in this direction

EXPERIMENTAL RESULTS



GTC= Greenhouse Tomato Control
GTT1= Greenhouse Tomato washed in modified dishwasher
GTT2= Greenhouse Tomato washed on flat system FTC= Field Grown Tomato Control
FTT1= Field Grown Tomato washed in modified dishwasher
FTT2= Field Grown Tomato washed on flat system

Figure 1. Growth of background bacteria on tomato samples treated with 40 ppm PAA.
*Treatments T1 and T2 included a potable water wash followed by a sanitizer, in this trial,40 ppm Sanidate®
* FTT2 might be higher because the tomatoes were just washed on one side in the crate.

CONCLUSIONS

- Field tomatoes had a much higher microbial load than the greenhouse produced product therefore sanitation is essential.
- Coliforms were present in both samples.
- The 2 different methods with proper sanitizer use are both effective and beneficial in reducing the food safety risk and enhancing the quality of the product.
- Shelf life was extended by proper sanitation

ACKNOWLEDGEMENT

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